Group B Pump Test Guidance

The proposed well must provide sustainable and reliable water production equal to or exceeding the minimum supply requirements needed to supply the proposed number of water systems connections (LCC8.55.110(3)(d)). A pump test is the best way to demonstrate this. A pump test is a well and localized aquifer stress test. It involves recording and evaluating periodic measurement of pumping rate and water level changes during a series of controlled pump and recovery ("rest") test cycles. The results show how both the well and the localized aquifer react to periods of intense pumping. Evaluating the degree of water level drawdown and the rate of water level recovery helps to characterize the aquifer's yield and establish optimal well pump placement and operating conditions.

When executed correctly, a pump test provides sufficient information to demonstrate the capacity of a well or collection of wells to produce enough water in a 24-hour period to service the water system as designed.

- A successful pump test must show the proposed well (or combination of wells) can provide a sustainable and reliable production of water (yield) equal to or exceeding the minimum supply requirements in LCC8.55.110(3)(d) and recover to pre-pumping level within a normal 24-hour operational period.
- A failed pump test is one that cannot demonstrate the required level of production and recovery within a normal 24-hour operational period.

You must select and Run a Recommended Group B Pump Test

Pump Test Procedure See Lewis County Group B Guideline Appendix F	**Recommended Conditions for Use**
Standard Step Drawdown/Constant Rate Test Appendix F-1	For sources located in: • Fractured rock, shale, bedrock, or hard rock (consolidated) aquifers. • Areas of known or suspected seawater intrusion. • Aquifers with highly variable seasonal water tables. • Aquifers with limited recharge. • An area with nearby large capacity wells that could affect local water levels and well yields.
Extended Step Drawdown Test Appendix F-2	• Low projected water demand wells in a high-flow aquifer setting. • *Most common for small Group B systems with proposed wells in sand and gravel aquifers.*
Alternating Pump and Recovery Test Appendix F-3	• Very small systems (2-6 connections) ***and*** • Very low flow aquifer conditions ***or*** • Failure on other tests

Prepare a Pump Test Report and Analysis:

The Pump Test Report (See Lewis County Group B Guideline Appendix F-4) documents the results of the pump tests, provides an analysis of the well, and localized aquifer responses to the challenge of sustained pumping. The designer can use that data to estimate aquifer characteristics, and determine pump and well operational factors and well efficiency. Elements of a complete report should discuss:

- ✓ Well yield
- ✓ Expected operational drawdown
- ✓ Pumping rates and recommended pump operational cycles
- ✓ Recommended pump placement
- ✓ Estimate of well efficiency
- ✓ An estimate of the aquifer's specific yield, hydraulic conductivity, or transmissivity (to support evidence of sustainability and aquifer capacity consistent with proposed use of the well)

If a pump test is unable to demonstrate a clear sustained yield as defined above, then the designer should re-run the test with different operational assumptions and conditions (lower pumping rate, add additional sources, or reduced total volume and associated connections). The designer might need to consider using an alternative test.

Additional considerations

- Low well yield contingency plan.
- Water quality test results.
- Risks of seawater intrusion (if appropriate).
- Reasons why stabilization was not achieved during testing.
- Well interference and well field considerations.

In challenging aquifer settings, a pump test can provide a starting point in the analysis and potential mitigation of any localized aquifer conditions that could adversely affect long-term use of the well (including concerns about saltwater intrusion, declining aquifer levels, consolidated and fracture rock aquifers, aquifers with limited recharge, and high seasonal water level variability). The pump test report is an appropriate place to highlight those issues and discuss supply-related options.

Pump test instructions, procedures, and reporting forms may be found in the Lewis County Group B Guidelines. They are posted on the Lewis County Website in the Public Health & Social Services Water Program section.